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EXPERIMENTS WITH WINTER WHEAT.

By C. A. Zavitz, B.S.A., Experimentalist.

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BULLETIN 100.

EXPERIMENTS WITH WINTER WHEAT.

By C. A. Zavitz, B.S.A., Experimentalist at Ontario Agricultural College and Experimental Farm, Guelph, Ont.

One hundred and ninety-seven plots were used for winter wheat experiments at the Ontario Agricultural College during the past season. About one-half of this number was used for testing varieties, and the remainder for testing different dates of seeding, methods of seeding, selections of grain for seed, quantities of seed per acre, the yield and quality of wheat cut at different stages of ripeness, and the value of seed from wheat cut at different stages of maturity. This bulletin gives a concise report of the principal results of these tests, and it also gives the average results of some of the experiments which have been conducted for a number of years past.

Field Conditions.

The plots used in 1895 for the winter wheat experiments were situated in the northern portion of the large experimental field which lies to the rear of the main College building. The land has a gentle slope to the south-west and its position is somewhat elevated. Hence it was considerably exposed to the cold winter winds, which were so prevalent last season. The soil, which is an average clay loam, was prepared on the bare fallow system, and received a coating of fifteen tons of farmyard manure per acre in 1894. The plots were all the same size, each containing exactly $\frac{1}{117}$ of an acre. The yields per acre have been determined by the actual yields of the plots.

Conditions of Season and Growth.

The grain for the various winter wheat experiments was sown early in September. The germination of the seed was good, and the growth upon the different plots during autumn was quite satisfactory. There were very frequent strong, cold winds during the winter, and the snow was so often blown from the plots that they were only very thinly covered during the greater part of the cold weather. As the slope in the land extends throughout the whole length of the plots, there was no chance for water to lie upon any part of them, but a considerable amount of sleet which came in the early spring, along with the influence of the cold weather, seriously injured many of the

less hardy varieties. Between the 12th and 22nd of May, there was frost on six different nights, and on one occasion a minimum thermometer on the College grounds registered only 22 degrees above zero. This late spring frost checked the growth of the crop considerably, but did not seem to do much injury further than this.

The past year has furnished us an excellent opportunity for studying the comparative hardiness of the different varieties under test, and some valuable object lessons under this head were furnished the thousands of Ontario farmers who visited the College in the month of June and witnessed the work which is being carried on in the Experimental Department.

Varieties Tested.

One hundred and two varieties of winter wheat were under test. The plots, as already intimated, were situated side by side and were exactly uniform in size. They were separated from each other by paths three feet wide. All the varieties were sown by hand at the rate of two bushels per acre, on September 6th, 1894, and the germination was quite uniform throughout. The varieties ripened between the 16th and 24th of July, which was about a day later than in 1894. The amount of rust and smut was small this season.

The following table gives the number of varieties tested and reported on within the past six years and also the average yields for each of these years :

Year.	Number of varieties grown each year.	Average weight of grain per measured bushel.	Average yield of—	
			Straw per acre.	Grain per acre.
		lbs.	tons.	bus.
1890	15	60.0	2.4	30.9
1891	23	63.3	2.0	52.9
1892	44	60.5	3.2	42.6
1893	52	58.4	2.1	29.9
1894	80	60.8	4.0	46.7
1895	102	60.4	1.2	26.1

It will be observed that there are great variations in the average results for the different years as given in the above table. The highest record in quality and yield of grain was made in 1891. That year an excellent opportunity was given for a comparison of the different varieties when grown under climatic conditions very favorable for the best development of the plants. In the years 1892 and 1894, much valuable information was obtained in regard to the compara-

tive strength of straw, as many of the varieties were badly lodged, while others, growing beside them, stood upright until ripe. In 1890, 1892 and 1893, there was a considerable amount of rust on our winter wheat; but, as many of the varieties were much more affected than others, we were enabled to make some valuable comparisons. Almost all the varieties came well through the winters from 1890 to 1894, but in 1895 many of them were very much winter-killed, while others, growing beside and between the injured ones, sustained little or no injury.

The varieties of winter wheat which are most desirable for cultivation in Ontario, are those which possess the greatest number of good and the least number of bad qualities. To compare the different varieties in this respect is the object of the present bulletin. From what is said in the preceding paragraph, the reader will readily understand that it is of great importance to have these experiments extend over a period of *several* years, in order to have the varieties subjected to various climatic conditions.

Characteristics and Yields of Varieties.

The following table contains the characteristics and the yields of one hundred and two varieties tested during the past season. The horizontal rows give information regarding the different varieties, and the perpendicular columns furnish a means of comparing the characteristics and yields of the varieties with one another. Starting at the left hand side of the table, columns 1 and 2 give the numbers and names of the varieties; 3 and 4 refer to their characteristics; 5, 6, 7 and 8 give results for 1895; and 9, 10, 11 and 12 give average results for four, three or two years, or for one year, as indicated in column No. 2. Of the first fifty-three varieties mentioned in the table, we have grown some for six years, others for five years, and the remainder for four years; but, to allow a better comparison of the varieties, the average results of only the last four years are here presented.

The reader's attention is especially directed to the last column on the right hand side of the table, as this gives the average yield of grain per acre of each variety for the number of years reported upon, and the varieties are arranged in the table according to these average yields, starting with the highest and finishing with the lowest.

There is, perhaps, not a winter wheat grower in Ontario but is quite familiar with some of the varieties herein reported upon, as many of the old varieties have been tested along with the newer kinds. The following table furnishes an excellent opportunity for each farmer to compare the respective merits of the varieties which he has not grown, with those of the varieties with which he is familiar.

Characteristics and Yields of 102 Varieties of Winter Wheat.

Varieties.	Heads bearded or bald.	Color of grain.	Results for 1895.				Average results for number of years reported upon as shown in first column to left.			
			Condition of crop in spring of 1896.	Weight per measured bushel.	Straw per acre.	Grain per acre (bus. 60 lbs.)	Amount of straw lodged.	Weight per measured bushel.	Straw per acre.	Grain per acre (bus. 60 lbs.)
Grown for four years.				lbs.	tons	bus.	p. c.	lbs.	tons	bus.
1. Dawson's Golden Chaff	Ba.	W.	Very good	59.9	1.8	40.3	2	59.5	2.9	48.7
2. Early Red Clawson.	Ba.	R..	Good	58.8	1.6	39.9	51	58.4	3.2	45.5
3. Egyptian	Be.	R..	Good	60.7	1.9	40.6	31	60.6	2.9	45.1
4. Golden Drop	Ba.	R..	Medium	59.3	1.4	31.5	51	61.2	3.2	43.7
5. Surprise	Ba.	W.	Good	57.4	1.8	35.4	22	58.6	2.9	43.0
6. Reliable	Be.	R..	Very good	61.1	1.8	35.9	15	61 5	2.8	42.0
7. American Bronze.	Ba.	R..	Very good	60.6	1.9	38.9	2	59.1	3.0	41.9
8. Bulgarian	Be.	W.	Good	60.6	1.3	28.7	19	61.3	2.6	41.3
9. Jones' Winter Fife.	Ba.	R..	Good	59.9	1.5	31.3	15	59.5	2.6	41.2
10. Golden Cross or Volunteer	Be.	R..	Medium	60.9	1.8	36.4	27	60.3	3.2	40.6
11. Standard	Ba.	W.	Good	59.9	1.7	40.3	14	58.3	2.8	40.5
12. Manchester	Ba.	R..	Good	61.5	1.5	34.9	23	60.4	3.0	40.4
13. Red Velvet Chaff	Ba.	R..	Very good	59.0	2.2	39.5	38	57.8	3.5	40.2
14. Bonnell or Landreth	Ba.	W.	Good	59.9	1.8	38.7	29	58.7	3.1	40.0
15. Russian Amber	Be.	R..	Medium	60.1	1.5	30.4	23	61.0	2.6	39.9
16. Walker's Reliable.	Be.	R..	Medium	60.5	1.1	28.0	26	60.8	2.7	39.0
17. Democrat	Be.	W.	Good	62.3	1.2	29.3	17	61.5	2.3	38.8
18. Winter Pearl	Ba.	W.	Good	62.3	1.7	35.0	16	61.2	2.5	38.6
19. Seneca or Clawson.	Ba.	W.	Good	59.3	1.7	33.8	29	58.9	3.0	38.6
20. Red Lion	Be.	R..	Good	59.5	1.7	33.7	68	60.7	3.3	38.5
21. Martin Amber	Ba.	W.	Good	61.9	1.5	32.7	37	60.3	2.9	38.2
22. Canadian Velvet Chaff	Ba.	W.	Good	57.6	1.5	29.1	16	57.2	2.6	37.7
23. Garfield	Ba.	W.	Good	60.8	1.5	30.6	24	59.7	2.4	36.8
24. Hybrid Mediterranean	Be.	R..	Very good	62.3	.9	22.0	35	60.9	3.1	36.8
25. New Monarch	Ba.	R..	Good	59.6	1.5	29.8	25	60.1	2.8	36.7
26. Mediterranean	Be.	R..	Medium	60.6	1.3	30.8	36	60.6	3.0	36.3
27. Manilla	Ba.	W.	Very good	60.1	1.5	34.3	15	58.0	2.6	36.1
28. Lancaster	Be.	R..	Very good	61.0	1.1	24.6	67	60.9	3.0	36.0
29. Rutherford	Be.	R.	Medium	61.0	1.1	26.3	35	60.0	2.9	35.9
30. Rogers	Ba.	R..	Very good	60.6	1.0	25.1	38	59.9	3.0	35.9
31. Fultz	Ba.	R..	Good	62.2	1.1	25.0	5	62.4	2.1	35.3
32. Valley	Be.	R..	Poor	60.1	.6	13.7	11	60.6	2.3	34.8
33. Monette	Ba.	R..	Medium	60.0	1.2	27.2	20	59.3	2.4	34.6

Characteristics and Yields of 102 Varieties of Winter Wheat.—*Continued.*

Varieties.	Heads bearded or bald.	Color of grain.	Results for 1895.				Average results for number of years reported upon as shown in first column to left.			
			Condition of crop in spring of 1895.	Weight per measured bushel.	Straw per acre.	Grain per acre (bus. 60 lbs.)	Amount of straw lodged.	Weight per measured bushel.	Straw per acre.	Grain per acre (bus. 60 lbs.)
Grown for four years.—*Con.*				lbs.	tons	bus.	p. c.	lbs.	tons	bus.
34. Hybrid Diehl	Ba.	W.	Medium	60.6	1.1	24.9	24	59.4	2.2	34.6
35. Genesee	Be.	W.	Medium	60.0	.9	21.5	20	60.1	2.4	34.1
36. Scott	Ba.	R.	Very good	61.3	1.4	34.2	13	60.1	1.4	33.6
37. Velvet Chaff	Be.	R.	Medium	62.8	1.1	25.8	3	62.5	2.2	33.2
38. Longberry Red	Be.	R.	Medium	60.3	.9	21.7	44	60.4	2.5	32.8
39. Deitz Longberry	Be.	R.	Medium	61.6	1.1	26.0	24	61.8	2.4	32.5
40. Rumsey	Be.	W.	Medium	60.0	.5	10.5	3	60.5	2.5	32.3
41. Red Wonder	Be.	R.	Medium	61.8	.9	22.3	36	61.7	2.9	32.0
42. Fulcaster	Be.	R.	Medium	59.8	1.3	10.3	27	61.6	2.7	28.4
43. Red Russian	Ba.	R.	Poor	61.4	....	21.8	5	60.2	2.3	27.9
44. Saumur	Ba.	R.	Medium	57.1	1.0	23.7	13	53.5	2.2	27.1
45. Red Inversible	Ba.	R.	Medium	59.9	.7	14.0	20	56.1	2.3	26.4
46. Spalding Red	Ba.	R.	Medium	61.9	.7	19.1	22	58.8	2.3	26.2
47. Browick Red	Ba.	R.	Medium	60.9	.9	26.5	13	54.8	2.2	25.2
48. Square Head	Be.	W.	Very good	60.0	.7	16.0	17	59.2	.7	24.5
49. Regent	Ba.	R.	Good	59.3	1.5	29.1	27	53.8	2.5	23.2
50. White Patanelle	Ba.	W.	Very good	59.6	.5	6.2	11	53.4	2.4	21.5
51. Dividend	Ba.	R.	Medium	58.8	.8	17.7	33	51.7	2.4	21.1
52. Galizien Summer	Ba.	R.	Good	59.6	.8	16.6	23	55.1	1.7	20.9
53. Kessingland Red	Ba.	R.	Medium	58.7	.8	20.7	13	51.2	2.0	20.4
Grown for three years.										
54. Stewart's Champion	Ba.	R.	Very good	60.4	2.2	43.5	5	58.6	2.9	38.9
55. Early White Leader	Ba.	W.	Medium	59.8	1.2	27.5	5	57.4	2.2	38.2
56. Soule's	Ba.	W.	Good	58.8	1.4	31.5	7	56.9	2.6	36.8
57. South Sea	Ba.	W.	Medium	59.4	1.1	23.8	3	59.9	1.9	35.0
58. Eureka	Ba.	W.	Good	59.0	1.4	28.1	6	57.7	2.3	34.3
59. White Star	Be.	R.	Medium	61.3	1.2	32.5	7	60.1	2.1	34.0
60. British Columbia	Ba.	R.	Medium	60.9	1.1	24.4	....	57.6	2.0	28.4
61. Treadwell	Ba.	W.	Very poor	59.0	.5	11.3	7	59.1	1.8	25.2
Grown for two years.										
62. Early Genesee Giant	Ba.	W.	Medium	61.3	1.4	36.4	8	61.1	2.7	46.7
63. Siberian	Ba.	R.	Very good	61.8	1.8	36.6	18	62.4	3.0	43.1
64. Early Ripe	Ba.	R.	Medium	61.9	1.3	27.7	21	61.7	2.8	41.5
65. Tasmania Red	Be.	R.	Good	61.9	1.5	35.3	45	61.9	3.0	41.2
66. Jones' Square Head	Ba.	W.	Very good	57.6	1.6	30.9	....	59.0	2.4	39.6

Characteristics and Yields of 102 Varieties of Winter Wheat.—*Continued.*

Varieties.	Heads bearded or bald.	Color of grain.	Results for 1895.				Average results for number of years reported upon as shown in first column to left.			
			Condition of crop in spring of 1895.	Weight per measured bushel.	Straw per acre.	Grain per acre (bus. 60 lbs.)	Amount of straw lodged.	Weight per measured bushel.	Straw per acre.	Grain per acre (bus. 60 lbs.)
Grown for two years.—*Con.*				lbs.	tons	bus.	p. c.	lbs.	tons	bus.
67. Pride of Genesee	Be.	R.	Medium	62.1	1.3	27.7	20	61.3	2.6	39.6
68. Turkish Red	Be.	R.	Very good	62.3	1.5	31.7	23	62.3	2.6	39.2
69. Egyptian Amber	Be.	R.	Good	61.9	1.3	32.1	33	61.1	2.9	38.1
70. McPherson	Ba.	R.	Very good	61.1	1.5	28.3	15	61.7	2.7	36.7
71. Arnold's Hybrid	Ba.	R.	Good	60.0	1.2	25.1	11	61.1	2.6	36.7
72. Imperial Amber	Be.	R.	Medium	59.9	1.5	29.2	45	59.0	3.2	36.3
73. Poole	Ba.	R.	Medium	59.6	.8	21.1	21	60.6	2.4	35.9
74. Zimmerman	Ba.	R.	Medium	60.8	1.2	26.7	1	61.9	2.1	35.5
75. Geneva	Be.	R.	Medium	63.2	1.2	30.0	34	62.4	2.7	35.1
76. Red May	Ba.	R.	Medium	62.2	.8	20.4	10	62.4	2.4	34.4
77. Emporium	Ba.	R.	Good	59.1	1.2	27.4	23	58.6	2.6	34.3
78. New Columbia	Ba.	R.	Medium	58.8	.6	16.3	8	58.5	2.3	33.2
79. Simcoe Red	Be.	R.	Very good	60.6	1.3	27.7	30	58.8	2.8	33.0
80. Tuscan Island	Be.	R.	Medium	59.5	.9	20.3	33	59.7	2.4	32.6
81. Kentucky Giant	Be.	R.	Medium	59.3	.8	18.4	35	58.9	2.4	31.8
82. Rudy	Be.	R.	Poor	61.4	.5	13.9	39	60.5	2.2	31.4
83. Penquit's Velvet Chaff	Be.	R.	Medium	61.9	.9	21.6	1	62.0	2.3	31.0
84. Bissell	Be.	R.	Medium	61.2	.8	20.3	36	61.0	2.4	30.2
85. Andrew's No. 4	Be.	R.	Medium	60.6	.7	17.1	24	60.3	2.6	29.7
86. Golden Tankard	Be.	R.	Very good	60.9	1.1	25.9	46	60.2	3.2	28.7
87. Currell	Ba.	R.	Medium	60.9	.8	20.2	20	61.2	2.5	28.7
88. Currell's Prolific	Ba.	R.	Medium	60.6	.8	19.6	25	61.1	2.6	28.2
89. Hindostan	Be.	R.	Medium	60.4	.5	11.7	23	61.0	2.3	28.2
90. Bullard's Velvet Chaff	Ba.	R.	Very poor	58.6	.2	3.5	....	60.8	1.3	17.6
Grown for one year.										
91. Michigan Amber	Be.	R.	Very good	61.8	1.4	35.5	....	61.8	1.4	35.5
92. Giant Square Head	Be.	W.	Good	60.1	1.4	33.4	....	60.1	1.4	33.4
93. White Bearded	Be.	W.	Good	58.9	1.3	31.8	....	58.9	1.3	31.8
94. Silver Star	Ba.	W.	Good	61.7	1.3	27.8	....	61.7	1.3	27.8
95. Amherst Isle	Be.	R.	Medium	59.9	1.1	25.0	3	59.9	1.1	25.0
96. German Emperor	Ba.	R.	Good	59.8	1.2	24.2	....	59.8	1.2	24.2
97. Hunter's Wheat	Be.	R.	Medium	60.9	1.0	22.4	....	60.9	1.0	22.4
98. Pride of Illinois	Ba.	R.	Good	60.2	1.0	21.5	....	60.2	1.0	21.5
99. Long Amber	Ba.	W.	Medium	59.0	.8	13.8	....	59.0	.8	13.8
100. Kalina	Be.	R.	Good	60.1	.8	17.6	....	60.1	.8	17.6
101. Mealy	Ba.	R.	Medium	60.4	.6	12.1	....	60.4	.6	12.1
102. Nonpareil	Be.	W.	Very poor	59.2	.4	7.4	....	59.2	.4	7.4

The varieties given in the preceding table were obtained from Ontario, the United States, Germany, France and Russia. Thirty kinds were imported from Europe by the College in the spring of 1889, and have been carefully tested in our plots; but, owing to lack of hardiness, twenty of the number have been discarded. The remaining ten have been grown for the past six years in succession, but are among the poorest yielders reported upon in this bulletin. All our leading varieties of winter wheat, therefore, have been obtained from either Canada or the United States. Mr. A. N. Jones, of Newark, N. Y., has been instrumental in introducing some very excellent varieties, among which the Early Red Clawson, American Bronze, Jones' Winter Fife and Early Genesee Giant are prominent. It is, however, to Mr. Robert Dawson of Paris, Ont., that we must give credit for Dawson's Golden Chaff, a variety which has made the highest average record of all the varieties tested at this station during the past four years.

Bald and Bearded Varieties. Of the one hundred and two varieties grown in 1895, fifty-six possessed bald heads and forty-six bearded heads. During each of the six years past, the bearded varieties gave a heavier weight per measured bushel than the bald sorts, but in yield of grain per acre the bald wheats came first in four out of the six years. In making up this comparison, varieties possessing very short beards were classed as bald wheats.

The following table gives the comparative results of the bald and the bearded varieties for 1895, and for the average of six years.

Periods.	Average results of bald varieties.			Average results of bearded varieties.		
	Weight per measured bushel.	Yield per acre.		Weight per measured bushel.	Yield per acre.	
		Straw.	Grain.		Straw.	Grain.
	lbs.	tons.	bush.	lbs.	tons.	bus.
1895.....	60.0	1.2	27.1	60.8	1.1	25.1
Average of 6 years, 1890-1895.....	60.1	2.5	38.8	61.3	2.5	37.1

Color of Grain. Twenty-nine varieties of white wheat and seventy-three varieties of red wheat were tested during the past year. In five of the last six years, the red wheats gave a heavier weight of grain per measured bushel than the white varieties, but in 1890 the white wheats gave slightly the heaviest grain. The amber, bronze and golden wheats have all been classed as red.

The following table gives the comparative results of the white and the red wheats for 1895, and for the average of six years:

Periods.	Average results of white wheat.			Average results of red wheats.		
	Weight per measured bushel.	Yield per acre.		Weight per measured bushel.	Yield per acre.	
		Straw.	Grain.		Straw.	Grain.
	lbs.	tons.	bush.	lbs.	tons.	bush.
1895.....	59.9	1.3	27.5	60.6	1.1	25.6
Average of 6 years 1890-1895	60.0	2.5	39.3	60.9	2.5	37.7

It will be seen from the above tables that the amount of straw in the average of six years' trials was the same from bald, bearded, white and red varieties of winter wheat. The bearded kinds produced the heaviest weighing grain and the white varieties gave the largest average yield of grain per acre.

Experiments in the Methods of Winter Wheat Growing.

The following concise reports are made upon different winter wheat experiments conducted in the same portion of the experimental grounds that was used for the variety tests. Some of these experiments extend over a period of two and some over a period of three years.

Different Dates of Seeding. During each of the past three years two or more varieties of winter wheat have been sown at three different times in the month of September. The following table gives the average yields for the three years occupied by this experiment:

Dates of seeding.	Weight per measured bushel.	Yield of straw per acre.	Yield of grain per acre.
	lbs.	tons.	bush.
September 2-3.....	57.8	2.4	31.8
" 7-9.....	58.0	2.5	31.3
" 17-19.....	56.2	1.6	25.2

It will be seen that the seedings of the 7th and 9th of September produced results about equal to those from the seedings of the 2nd

and 3rd. Such is not the case, however, when the results of the last dates are compared with those of either the first or the second, as they are considerably lower in every particular.

Methods of Seeding. An experiment in sowing winter wheat broadcast and with a grain drill has been conducted in duplicate during the past two years. The results show the yields of both straw and grain to be practically the same from sowing similar quantities of grain by the two methods; but, in weight of grain per measured bushel, the product of the drilled grain has been heavier than that sown broadcast in each of the four tests, the average difference being two-fifths of a pound.

Different Quantities of Seed per Acre. In 1894 and in 1895, two varieties of winter wheat were sown broadcast on small plots, at the rates of one, one and one-half and two bushels per acre. The largest yields of both grain and straw were obtained from the thickest seeding and the smallest yields from the thinnest seeding during each of the two years. The weight of grain per measured bushel was nearly the same from all the plots. To determine the proper quantity of winter wheat to sow per acre, in order to obtain the best results upon different farms, the individual wheat growers can best experiment for themselves, as so much depends upon the fertility of the soil and other conditions.

The Yield and Quality of Winter Wheat as affected by cutting at different stages of maturity. Five plots each of the Dawson's Golden Chaff and the Early Genesee Giant varieties of winter wheat, were sown upon the same date in 1893 and again in 1894. These two varieties reached the stage of maturity at which wheat is usually cut in Ontario, on the 19th of July, in 1894, and on the 18th of July in 1895. The two wheats were cut at five different periods during the two years, as follows: July 4th, July 11th, July 18th and 19th, July 25th and August 2nd. During both years, the greatest yield of straw was obtained from cutting on July 4th, and the heaviest weight of grain per measured bushel from cutting on July 18th and 19th. The yield of grain per acre was largest from the last cutting in 1894 and from the second last cutting in 1895. The lowest results in yield of grain per acre and in weight of grain per measured bushel, were obtained from the cutting of each variety on July 4th of each year.

Value of Grain for Seed as affected by cutting at different stages of maturity. Dawson's Golden Chaff and the Early Genesee Giant varieties of winter wheat were both sown on the same day in 1893, and a plot of each was cut on July 4th, 11th, 19th and 25th, and August 2nd, 1894. The first cutting took place about two weeks before, and the last cutting about two weeks after, that stage of ripeness at

which winter wheat is usually cut. A quantity of seed of each variety was taken from each of the five different cuttings, and these ten equal amounts of grain were sown upon a similar number of uniform plots on Sept. 7th, 1894. In 1895, the plots were all harvested at one time, and, in the case of each variety, it was found that the largest yield of grain per acre was produced by the seed of the last cutting of the previous year, and the plumpest sample was produced from the seed of the second and third cuttings.

Selection of Seed. Several experiments are being conducted in the selection of grain for seed; but it will be some time before the most valuable results can be obtained from this line of experimental work.

Co-operative Experiments with Winter Wheat.

Fifteen varieties of winter wheat, which have been the most successful among all the varieties tested on our experimental grounds, have been distributed over Ontario within the past three years. These have been sent out in sets of five varieties each. Five thousand eight hundred packages of winter wheat alone have been distributed during the three years, and comparative tests have been made upon more than eleven hundred Ontario farms. This system of co-operative experimental work was established by the ex-students of the Agricultural College; but, through repeated requests from other farmers, the invitation is extended to all interested persons to join in the work. The results have, on the whole, been very gratifying and the numerous experimenters have become much interested in the different experiments undertaken. For detailed reports of these co-operative experiments, the reader is referred to the Annual Report of the Agricultural Experimental Union which is printed along with the report of the Agricultural College. From among ten conclusions given in the report of last year regarding these co-operative experiments with winter wheat for 1894, the following two conclusions are quoted as being of interest in connection with the results given in this bulletin.

1. "Dawson's Golden Chaff gave the largest yield of grain per acre among the nine varieties tested over Ontario in 1894, as well as among the eleven varieties tested in 1893."

2. "Dawson's Golden Chaff was decidedly the most popular variety with the experimenters in both 1894 and 1893."

All the varieties of winter wheat distributed over Ontario each year are grown in duplicate in our Experimental Department on exactly the same sized plots that are used throughout the Province.

Conclusions.

1. The average results of winter-wheat growing on the experimental plots for six years in succession are as follows: Weight of grain per measured bushel, 60.6 lbs.; yield of straw per acre, 2.5 tons; and yield of grain per acre 38 2 bushels.

2. Dawson's Golden Chaff gave the largest average yield of grain per acre among fifty-three varieties of winter wheat grown at the Ontario Agricultural College for four years in succession; also among nine leading varieties tested over Ontario in 1894, and among eleven leading varieties tested over Ontario in 1893.

3 The varieties which possessed the stiffest straw among fifty-three kinds of winter wheat grown for four years in succession, were Dawson's Golden Chaff, American Bronze, Fultz, Velvet Chaff and Red Russian.

4 The varieties of winter wheat which proved the hardiest in 1895, among one hundred and two varieties tested, were Dawson's Golden Chaff, Stewart's Champion, Siberian, Jones' Square Head, Turkish Red and McPherson.

5. When winter wheat was sown later than September 9th, the crop was much poorer than when the seeding took place on or before that date.

6. In 1895, the varieties of winter wheat possessing bald heads and white grain gave an average of 4.3 bushels of grain per acre more than the varieties possessing bearded heads and red grain, but in average weight per measured bushel the latter surpassed the former by 1·3 pounds.

Distribution of Seed for Testing Purposes.

In the following table will be found two sets of winter wheat varieties, which will be sent free, by mail, in half-pound lots of each variety to farmers applying for them, who will carefully test the five kinds in the set which they choose, and will report the results after harvest next year. The seed will be sent out in the order in which the applications are received, as long as the supply lasts.

Two sets of winter wheat for Co-operative Tests.

Set 1.	Set 2.
Dawson's Golden Chaff.	Dawson's Golden Chaff.
Early Red Clawson.	Early Genesee Giant.
Jones' Winter Fife.	Pride of Genesee.
Surprise.	Bulgarian.
American Bronze.	Jones' Square Head.

Each person wishing one of these sets should write to the Experimentalist, Agricultural College, Guelph, *mentioning which set he desires*, and the grain, with instructions for testing and blank forms on which to report, will be forwarded free of cost to his address, until the supply of grain for distribution becomes exhausted.

Seed Wheat.

The Dawson's Golden Chaff and the Early Genesee Giant varieties of winter wheat were grown in the Farm Department in 1895. Limited quantities of these are offered for sale by the Farm Superintendent at $1.25 per bushel for the former and $1.50 per bushel for the latter. The price of cotton bags is 20 cents each and of jute bags 10 cents.